UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/296,588	04/23/1999	MINHUA LU	YO998-532	8615

28211 7590 01/11/2005

FREDERICK W. GIBB, III
MCGINN & GIBB, PLLC
2568-A RIVA ROAD
SUITE 304
ANNAPOLIS, MD 21401

EXAMINER	
QI, ZHI QIANG	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/296,588	LU ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The claims 1, 3-5, 7-8, 10, 15, 17-19 have been amended.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5, 7-10, 12, 14-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,344,888 (Yasukawa) in view of US 4,972,250 (Omori et al) and US 4,640,744 (Howe).

Claims 1-3, 7-10, 14-17, Yasukawa discloses (col.6, line 48 – col.7, line 52; col.15, lines 25-52; Figs. 1-7) that a reflection liquid crystal panel comprising:

- a counter electrode (common electrode 33) composed of a transparent electrode (ITO), i.e., a first-type electrode or a transmissive electrode;
- a reflective electrode (pixel electrode 14) using aluminum, i.e., a second-type electrode or a reflective electrode positioned opposite the transmissive electrode (the transmissive electrode is an opposite type of the reflective electrode);
- a liquid crystal material (37) between the transmissive electrode (33) and the reflective electrode (14);

- since the claims 7 and 14 described that the amorphous carbon layer comprising a passivation layer and since the specification (page 7, line 10; and page 6, lines 7-8;) described that the amorphous carbon layer is a passivation layer and the amorphous layer is a . . . SiO_2. . .; such that Yasukawa discloses that a passivation film (17) is formed on the entire pixel electrode (14) and is composed of a silicon oxide (SiO_2) (i.e., one of the first-type electrode and the second-type electrode having a passivation layer (amorphous carbon layer) which is adjacent the liquid crystal material.

Yasukawa does not explicitly disclose that the amorphous carbon containing layer or diamond-like amorphous carbon layer (passivation layer) provides a level of conductivity corresponding to a resistivity between 10^4 and 10^{11} ohm-cm (the amorphous carbon containing layer or diamond-like amorphous carbon layer 'passivation layer' having a resistivity between 10^4 and 10^{11} ohm-cm).

However, Omori discloses (col.4, lines 19-49) that the passivation material is amorphous carbon or diamond-like carbon (carbon having a diamond-like structure); and the semiconductive passivation material having diamond-like carbon characteristics dissipates charge build-up very quickly so that drift (the electrical drift) problems are minimized. Omori indicates (col.3, lines 6-13) that such passivation material is also applicable to other electrical assemblies such as thin film circuits (liquid crystal display also is a thin film circuits). Therefore, the semiconductive passivation material using amorphous carbon or diamond-like carbon in an electrical assembly would minimize the electrical drift problems.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use amorphous carbon-containing layer or diamond-like amorphous carbon layer as a passivation layer for eliminating the electrical drift problems.

Still lacking limitation is such that the amorphous carbon layer or the diamond-like amorphous carbon layer having a resistivity between 10^4 and 10^{11} ohm-cm.

However, Howe discloses (col.4, lines 46 – col.5, line 27) that the resistivity of the amorphous carbon can be controlled over the range from about 0.1 to greater than about 10^{11} ohm-cm, and the amorphous carbon is utilized as a film which has been deposited on a substrate (deposited on conductors such as deposited on electrodes) which may be either an electrically conducting material or an insulating material. Howe discloses (col.1, lines 9-11; col.8, lines 35-36) that the amorphous carbon is used as an electrode material in electrochemical cell, and an electrochemical cell contain at least two electrodes (liquid crystal display contain at least two electrodes), and the amorphous carbon layer is passivated on the electrodes. Howe indicates (col.3, lines 56 – 60) that the amorphous carbon is utilized in the fabrication of highly effective electrodes.

According to MPEP 2144.05, in the case where the claimed range "overlap or lie inside ranges disclosed by the prior art (such as the range 10^4–10^{11} ohm-cm overlaps the range 0.1-10^{11} ohm-cm)" a prima facie case of obviousness exists.

Therefore, the ordinary skilled in the art would be able to combine those prior art to change the material of the passivation layer (using amorphous carbon or diamond-

like amorphous carbon); and passivated on electrodes (pixel electrode or common electrode) to eliminate the electrical drift problems so as to obtain a high effective electrode; and the resistivity is a property of the material of the amorphous carbon.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to utilize amorphous carbon-containing layer or diamond-like amorphous carbon layer passivated on electrode having resistivity of 10^4–10^{11} ohm-cm as claimed in claims 1-3, 7-10, 14-17 for eliminating the electrical drift problems and achieving highly effective electrodes.

Claims 5, 12 and 19, Yasukawa discloses (col.7, lines 37-38) that a polyimide alignment film is formed on the entire passivation film (17), i.e., a polyimide layer is formed between the passivation film (as the amorphous layer) and the liquid crystal material.

3. Claims 4, 11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasukawa, Omori and Howe as applied to claims 1-3, 5, 7-10, 12,14-17 and 19 above, and further in view of US 5,990,988 (Hanihara et al).

Claims 4, 11 and 18, lacking limitation is such that the amorphous layer has a unidirectional orientation matched to the liquid crystal material.

However, Hanihara discloses (col.5, line 41 – col.6, line 37; Fig.1) that an alignment film (8) made of silicon oxide (the specification page 7, lines 2-5 described that the amorphous carbon layer comprises SiO_2) is formed on the electrode (7), such that amorphous carbon-containing layer has a function to be an alignment film (having a unidirectional orientation matched to the liquid crystal material), and also functions as a

protection film (passivation). Hanihara also indicated (col.5, lines 54-55) that the black matrix (9b) provided in the conventional display panel shown in Fig.10 is obviated, and such liquid crystal panel thereof is miniaturized and easy to manufacture (col.3, lines 54-57).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use amorphous carbon containing layer serving as orientation as claimed in claims 4, 11 and 18 for achieving easy to manufacture.

4. Claims 6, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasukawa, Omori and Howe as applied to claims 1-3, 5, 7-10, 12,14-17 and 19 above, and further in view of Applicant admitted prior art (AAPA).

Claims 6, 13 and 20, lacking limitation is such that a voltage between the pixel electrode and the common electrode varies the transparency of the liquid crystal material.

However, AAPA discloses (col.3, lines 1-4) that varying the voltage to the electrode (106) (the pixel electrode) controls the liquid crystal cell (111), such that different amount of light are transmitted across the liquid crystal display (different transparency of liquid crystal material), thus resulting in the display of a gray scale of light. The voltage applied to the gate line of the TFT that is also varying the voltage applied to the pixel electrode, so that varies the voltage between the pixel electrode and the common electrode to control the transparency of the liquid crystal.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a voltage between the transmissive electrode and the

reflective electrode varies the transparency of the liquid crystal material as claimed in claims 6, 13 and 20 for achieving a display of gray scale as taught by AAPA.

Response to Arguments

5. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) US 4,084,986 (Aoki et al) discloses (abstract) that the amorphous layer can be converted into a semi-insulating layer having a resistivity of 10^7–10^{11} ohm-cm, which has improved passivation property.

2) US 5,039,358 (Birkle et al) discloses (col.1, line 47 –col.2, line 58) that using amorphous, hydrogenated carbon material as a diamond-like carbon to produce passivation layer, and the required resistance value can be adjusted through the deposition conditions.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
January 6, 2005

TARIFUR R. CHOWDHURY
PRIMARY EXAMINER